**Motivation: what is the problem and why is it important?**

Encapsulation and interface. But transparent.

LLVM IR is a interface, a uniform standard, the representation allows many kinds of optimization. reuse.

As a whole system, information is collected and share through the process. Consistent lont-term optimization

LLVM wants to haunt a program for its lifetime, optimizing it as many times as possible.

垄断, but since LLVM is open-source, it only has 优点没有缺点

Generalization, Designed to be compatable with as many as high-level languages

Because at all stages of a program, LLVM infrastractures are used /pervasive, the system can

**Key results: what are the important results and how did the compiler enable them.**

Explain 5 properties

How LLVM express these properties

Cross languages optimization.

**Compiler component: what is the compiler component and how does it relate to what we have learned?**

Global and Inter-procedure optimization / Constant proppergation

Flow analysis? upward downward

Illustrative example: a small example to explain